Skyscanner

**National Weather Service
Aberdeen, South Dakota**

Winter Continues…Keep yourself safe

Winter storms, especially blizzards, can be very dangerous. Preparing before extremely cold snowy weather happens can save your live. Know what winter storm watches and warnings mean. If a Winter Storm Watch has been issued for your area, hazardous winter weather conditions (such as snow greater than 6 inches in 24 hours, winds gusting over 35 mph, or visibilities less than 1/4 mile) are expected in the next 12 to 36 hours. A Winter Storm Warning means the conditions listed for the Watch currently exist.

A winter survival kit could mean the difference between life and death during particularily bad winter storms. Here are some items that should be included.

At home or work:

- A working flashlight
- A battery powered weather radio, radio or TV
- First aid supplies
- Heating fuel

- Emergency heating source
- Fire extinguisher

In cars or trucks

- Blankets/sleeping bags
- Flashlight with extra batteries
- Knife
- High calorie, non-perishable food
- A small can, candle and water-proof matches to melt snow for drinking water
- Sand or cat litter
- Shovel
- Windshield scraper
- Tool kit
- Tow rope
- Jumper cables
- Water container
- Compass
- Road maps

Winter Wishes

Your best bet is to stay indoors during a blizzard. If you have to go outside to check on animals or for another reason, be sure to dress warmly in loose fitting layers of clothing. Wear heavy gloves to protect your hands and heavy socks with boots that will not absorb water. Cover your mouth so that you don't breathe in freezing, cold air that can damage your lungs. Keep your body dry. Know the signs of hypothermia or frostbite. For more information on hazardous weather safety...check out www.weather.gov/aberdeen or www.breadysd.com.
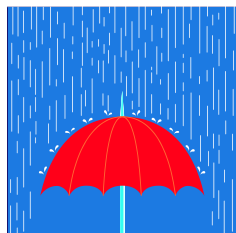
2007—One of the Wettest Years on Record

"Many locations across the area approached or broke record yearly rainfall totals in 2007"

Due in part to a wet spring across mostly northeast South Dakota and west central Minnesota, and a wet summer and fall across central and north central South Dakota, many locations across the area approached or broke record yearly rainfall totals in 2007. Note that all precipitation records referred to here are from 1932 to the present.

The wet year was characterized by extreme precipitation events, both monthly and daily, throughout the area. Monthly precipitation records were broken at Aberdeen (May, 12.23"), Mobridge (August, 6.20"), Pierre (October, 5.69"), and Watertown (February, 2.07" - a month which also tied the all-time snowiest month in Watertown with 27.0 inches of snow). In addition, several extreme daily rainfall events occurred: Aberdeen shattered its all-time daily and 24-hour rainfall records with 7.62" of rain on May 5, 2007 (7.75" in 24 hours). On the same day, Groton broke the South Dakota state 24-hour rainfall record with 8.74" of rain. Mobridge recorded 4.43" of rain on August 17, 2007, breaking its all-time daily rainfall record. 7.02 inches of rain fell at Wheaton, MN on June 2, 2007, which also was a new daily record for that location.

Wheaton broke the previous annual precipitation record of 32.59 inches set in 1995, recording 34.16 inches in 2007. Aberdeen had its second wettest year on record with 28.22 inches of precipitation. The record is 28.50 inches set in 1998. Precipitation data for Wheaton and Aberdeen on which the records are based date to 1932.

The following table outlines final 2007 precipitation totals, total yearly precipitation rank for 2007, the record and normal annual precipitation amounts, and the period of record for precipitation.

Location	2007 Precipitation	Precipitation Rank: 2007	Record Annual Precipitation	Normal Annual Precipitation	Period of Record
Wheaton	34.16"	1st (Wettest)	32.59" (1995)	22.54"	1932 - 2007 (76 years)
Aberdeen	28.22"	2nd wettest	28.50" (1998)	20.22"	1932 - 2007 (76 years)
Pierre	25.95"	5th wettest	31.24" (1997)	19.88"	1933 - 2007 (75 years)
Mobridge	21.46"	11th wettest	25.78" (1946)	16.94"	1932 - 2007 (76 years)
Kennebec	22.70"	15th wettest	26.28" (1998)	18.71"	1932 - 2007 (76 years)
Sisseton	26.15"	19th wettest	33.48" (2005)	22.08"	1932 - 2007 (76 years)
Watertown	24.18"	23rd wettest	40.04" (1977)	21.94"	1932 - 2007 (76 years)
Timber Lake	18.16"	31st wettest	28.48" (1995)	18.60"	1932 - 2007 (76 years)

Snow Sensor Study Continues

For the second winter season in a row, The National Weather Service Office in Aberdeen is participating in the Snow Depth Sensor study with Colorado State University. Aberdeen joins fourteen other Weather Forecast Offices throughout the country, along with two NWS Test Bed Sites and one COOP site, in the testing of automatic snow depth sensors.

The purpose of the study is to test the accuracy of the sensors with the goal they might be included as part of the NWS automated observing network. Many different locations around the country were chosen, due to the great variety of different snow types and environmental impacts. For example, Aberdeen was chosen to participate due to its drier and windier winter season, as opposed to Buf-

falo NY, chosen for its lake effect snow and relatively wetter winter season. Snow takes on different properties based on air temperature, as well as other environmental properties. Manual Snow measurements, taken every six hours, are compared to the sensor values to determine how well the sensors measure snow depth in a given environment.

The SR50 Sonic Ranging Sensor, manufactured by Campbell Scientific Inc, utilizes ultrasonic technology to sense the depth of snow directly below the sensor. It sends a pulse of energy out and listens for a return, effectively measuring the distance from the sensor to the top of the snow layer. This allows for the calculation of the snow depth.

Correct snow depth meas-

urements are extremely important, impacting many areas of public safety. Water resources depend on snowmelt to accurately estimate levels of public water in reservoirs, streams, rivers or any other public water source. Emergency Management also relies on accurate snow measurements for community snow removal and road safety. A lack of human observers poses a problem for snow measurement in remote locations. A solution to this is the successful implantation of automatic snow sensing equipment, resulting in a more robust snow observing network.

For more information on the Snow Sensor Study, the participating offices, and the sensors themselves, visit http://snowstudy.cocorahs.org.

"The purpose of the study is to test the accuracy of the sensors"
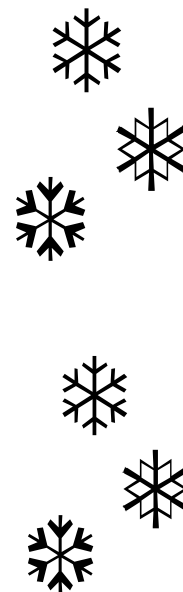
2007 Weather Review

By far the biggest weather event of 2007 was the disastrous flooding in the James River Valley and points east on May 5th and 6th where 3 to 10 inches of rain fell. Millions of dollars in flood damage occurred to hundreds of homes, businesses, roads, along with crops. Also, the devastating snowmelt and ice jam flooding in Browns Valley, Minnesota on March 14th along with the heavy rain flooding on August 17th and 18th in and around Mobridge.

Listed below are some of the more prominent weather events of the year.

-The heavy snow and blizzard at the end of February and for the first few days of March. Snowfall amounts ranged from 2 to 22 inches with widespread near zero visibilities as winds gusted to 50 to 60 mph.

-The heavy snow and very cold air in early April where 6 to 12 inches of snow fell across northern South Dakota and temperatures fell to 10 to 30 degrees below normal across the entire area.

-The late July heat and humidity which contributed to the deaths of nearly 3000 cattle in northeast South Dakota.

-The very wet month of October for central and north central South Dakota where Pierre set its monthly precipitation record.

-The extremely dry November across all of the area followed by heavy snow on December 1st.

-Wheaton set a yearly precipitation record of 34.16 inches where normal is 22.54 inches. Aberdeen had its second wettest year with 28.22 inches where normal is 20.22 inches. Pierre had its fifth wettest year with 25.95 inches where normal is 19.88 inches. Finally, Mobridge had its 11th wettest year with 21.46 inches where normal is 16.94 inches.

-The ongoing long term drought along and west of the Missouri River finally came to an end in early June. According to the Weekly Drought Monitor, not one single county across central, north central, northeast South Dakota, and west central Minnesota were dry by early June. With a very dry period from the end of June into early July, drought conditions began to creep back into the area. By the end of July, severe drought conditions developed into central South Dakota to the west of the Missouri River and into northeast South Dakota. The drought continued through August with improvement by the end of the month across the area. Northeast South Dakota and central South Dakota dropped out of the severe drought category by the end of August. The drought conditions would continue to improve through September with the area not considered to be dry again by the middle of October.

-The James River rose above flood stage in late April and early May with the snowmelt and heavy rain in early May and continued above flood stage throughout much the summer. As a result, several roads along with agricultural land were flooded throughout the summer. The James River finally fello below flood stage in early September.

"Millions of dollars in flood damage occurred"

New Forecast Tool at NWS Aberdeen

A new forecast tool has recently been added to help forecasters at the NWS in Aberdeen. The product name is "CRAS," which stands for CIMSS Regional Assimilation System (*CIMSS* is the Cooperative Institute for Meteorological Satellite Studies located at the University of Wisconsin-Madison). Essentially, CRAS is a computer model which emphasizes the use of satellite information during the initialization stage of the model. NWS Forecasters can view output from this model in 3 hourly intervals, out three days (72 hours) into the future. So, what is different about this new tool? The CRAS output can be thought of as a "simulated satellite image." In other words, the model gives forecasters a depiction of how satellite pictures will look at a given time in the future. Forecasters can then identify specific cloud features which in turn can affect:

1) temperature forecasting (clear skies vs cloudy skies)
2) precipitation coverage and intensity (heavy rain vs light rain vs no rain)
3) aviation impacts (when will the clouds affect a given airport)

In the figure below, the panel on the left represents the CRAS simulated infrared (IR) imagery, with the right hand panel showing the actual IR imagery from the GOES satellite at the same time. Notice that the CRAS does a good job depicting the main areas of clouds over California, southern New Mexico, and western Iowa. However, the model tends to underdevelop the intensity of the cloud cover. Over South Dakota, the CRAS indicated mainly clear skies, which appeared to verify based on the IR satellite image.

As shown in the example, the CRAS model has potential to be a useful tool for NWS meteorologists. More studies will be conducted in the future to assess how to best use the output in the forecast process.

"a computer model which emphasizes the use of satellite information"
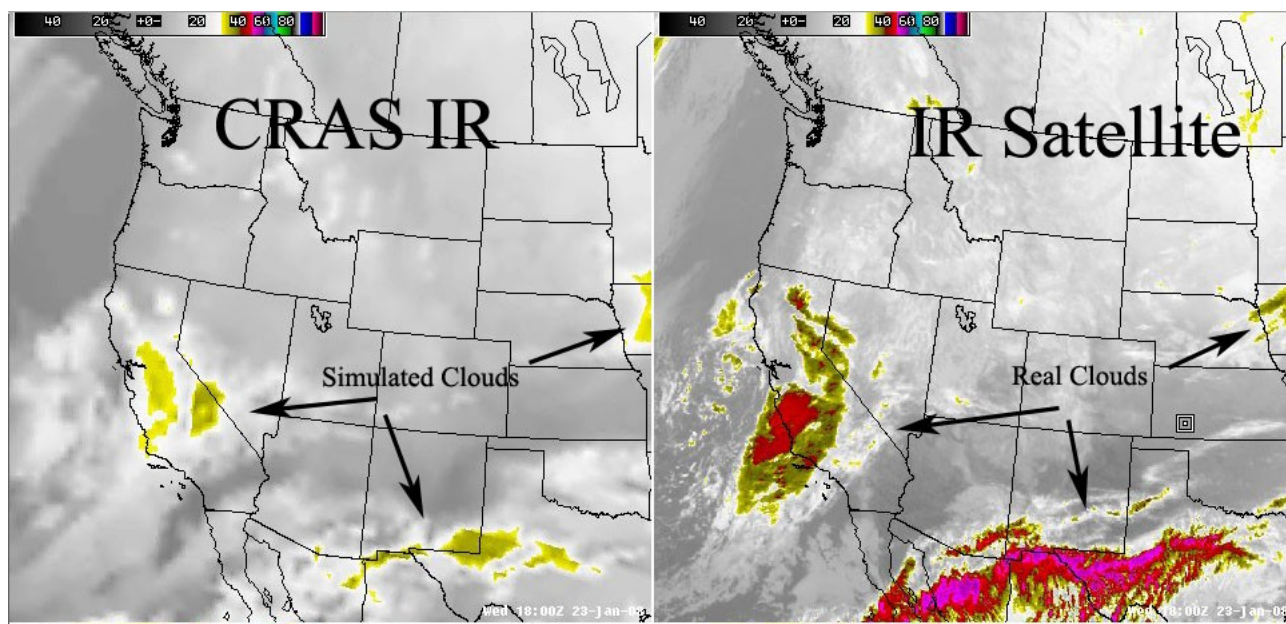
Skywarn Spotter Training Classes Coming Soon

Skywarn severe weather spotter training classes are being scheduled for this spring. What are Skywarn severe weather spotters? They are a network of volunteers that provide weather information to the National Weather Service when thunderstorms inevitably strike South Dakota. Information such as hail size, wind speed, tornado signatures, and rainfall rates/amounts aid the operations team at the NWS in getting life-saving information out to the general public. The National Weather Service could not do it with out our trained spotters!

So how does someone become a trained spotter? Beginning in March through about mid-May, the National Weather Service will be coming to a community near you to conduct a short class that covers the basics of severe weather spotting. You can get signed up at that class to join the Skywarn network. In order to continue to be a spotter after your initial attendance, we ask that you continue to take the training at least once every other year to remain proficient. There is no cost to take the course!

As sessions are scheduled, an updated list of communities and venues will be available on our website at www.weather.gov/aberdeen. If you have any questions about the Skywarn program or taking the class, please contact the NWS Aberdeen Warning Coordination Meteorologist, Jennifer Zeltwanger, at jennifer.zeltwanger@noaa.gov, or 605-225-0519.
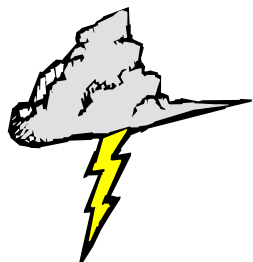
New Employee

My name is Tracy Leberman and I am a newly hired Electronics Technician. I am married to Annette and we have a 3 year old son, Max and a 19 month old daughter, Reagan. I graduated from Warner High School in 1986...and from North Dakota State School of Science in 1991.

I moved to Glendive, Montana after college to accept a position as a High Voltage Substation Technician for Montana Dakota Utilities Co. I was there 4 years before transferring to Bismarck, ND where I spent 1 year as crew foreman.

In 1996, I married Annette and accepted a position as a Systems Technician at 3M in Aberdeen. I worked there from 1996 to 2002. We built a house at Richmond Lake where we still live today.

In 2002, I entered government service with the Department of Energy. I worked for Western Area Power Administration as Substation Electrician in Bismarck, ND. I was there for 2 years before transferring to Watertown, SD.

I enjoy spending time with my wife and kids. Some other interests include football (Oakland Raiders), sky diving, auto racing, boating, snowmobiles, and ATV's. I would also like to start taking flying lessons.

Thank you for the warm welcome. I'm looking forward to being a part of the National Weather Service.

Tracy Leberman
Electronics Technician

What is Hoar Frost?

A deposit of interlocking crystals formed by direct sublimation on objects, usually those of small diameter freely exposed to the air, such as tree branches, plants, wires, poles, etc. The deposition of hoar frost is similar to the process by which dew is formed, except 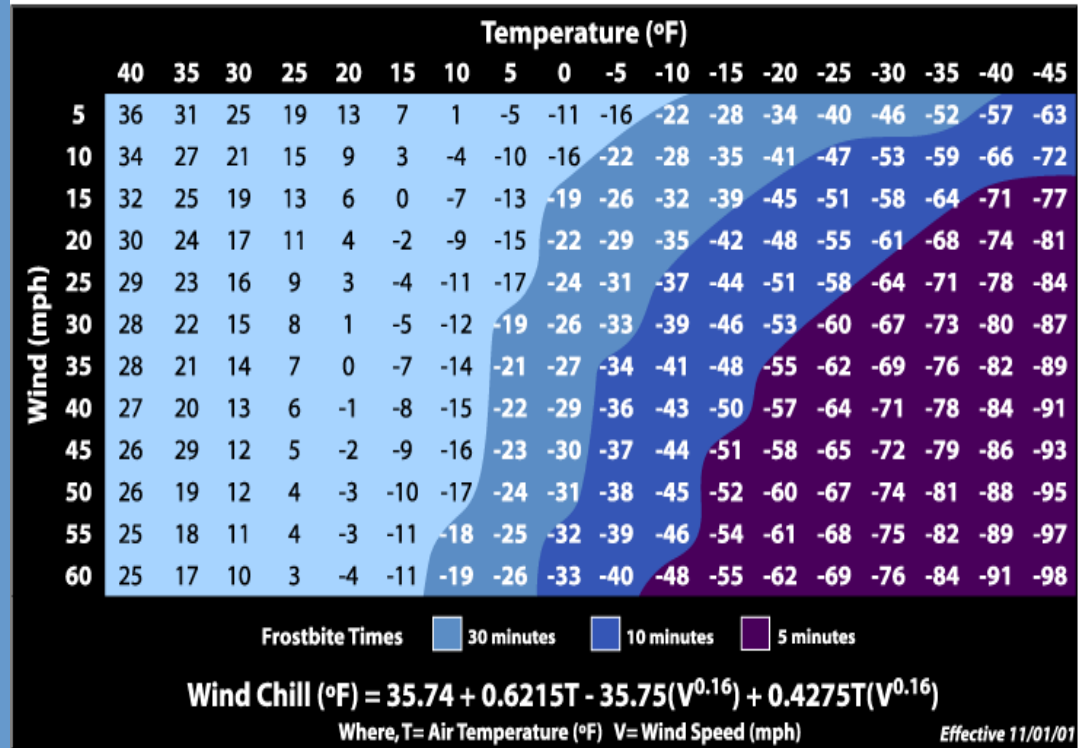that the temperature of the frosted object must be below freezing. It forms when air below freezing with a dew point below freezing is brought to saturation by cooling. Typically, when sub-freezing saturation occurs, freezing fog develops in addition to the formation of frost. Here is a picture of hoar frost deposits outside the NWS office in Aberdeen.

Hoar Frost

Wind Chill Chart

Temperature (°F)	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
Wind (mph) 5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	29	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes | 10 minutes | 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T = Air Temperature (°F)   V = Wind Speed (mph)

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www.weather.gov/aberdeen

No winter lasts forever;
no spring skips its turn.

~ Hal Borland